

I CLAIM:

1. An apparatus for implementing a game, the game having a deterministic component, a rule based non-deterministic component, and a random component, the apparatus comprising:

5 a first player interface unit generating at least a first player record of information indicating player-initiated events from a first player;

10 a random number circuit providing an output signal comprising a series of uniformly distributed pseudo-random numbers;

15 verification means coupled to receive the output signal from the random number circuit for verifying that the received pseudo-random numbers are statistically random, the verification means having an output for supplying a series of verified pseudo-random numbers;

20 buffer means coupled to receive the verified pseudo-random numbers for temporarily storing the verified pseudo-random numbers, the buffer means having an output for distributing the stored verified random numbers;

25 first control means coupled to the buffer means, verification means, and the random number circuit for activating the random number circuit and the verification means and causing the buffer means to deliver a set of the stored verified pseudo-random numbers on the buffer means output;

a rules library storing indexed rules for one or more games;

30 an interface registry for storing mapping data records, the mapping data records for mapping the

first player record to pre-selected rules in the rules library;

35 combinatorial algorithm storage means having a bi-directional input/output port for storing combinatorial algorithms in an executable form; and

40 second control means coupled to the buffer means output, the first player interface unit, the interface registry, the combinatorial algorithm storage means, and rules library, the second control means for processing the player record, the processing comprising the steps of:

(i) accepting the first player record,

45 (ii) referring to the interface registry to map the first player record to a selected rule in the rules library,

50 (iii) executing the selected rule by selectively referring to the combinatorial algorithm storage means and selectively generating requests for sets of verified pseudo-random numbers from the buffer means output, and

(iv) generating an output record indicating results of the execution step, the output record directed to the first player interface unit.

2. The apparatus of claim 1 wherein the random number circuit comprises an ANSI X9.17 circuit.

3. The apparatus of claim 2 wherein the random number circuit comprises an international data encryption algorithm (IDEA) encryption circuit.

4. The apparatus of claim 2 wherein the random number circuit comprises a data encryption standard (DES) encryption circuit.

5. The apparatus of claim 2 wherein the random number circuit further comprises a continuously running clock circuit providing a clock output to the encryption circuit, means for providing at least one key value to the random number circuit, and means for providing at least one seed value to the random number circuit, whereby the encryption circuit encrypts the clock output using the at least one key value and the at least one seed value to provide the series of pseudo-random numbers.

6. The apparatus of claim 1 wherein the verification circuit comprises means for testing independence of the received pseudo-random numbers.

7. The apparatus of claim 6 wherein the means for testing independence uses a runs test.

8. The apparatus of claim 1 wherein the verification circuit comprises means for testing uniformity of the received pseudo-random numbers using a Kolmogorov-Smirnov test.

9. The apparatus of claim 1 wherein the verification circuit comprises means for testing uniformity of the received pseudo-random numbers using a Chi-square test.

10. The apparatus of claim 1 wherein the verification circuit comprises means for testing uniformity of the received psudo-random numbers in more than one dimension using a series test.

11. The apparatus of claim 1 further comprising means coupled to the second control means for accepting the series of uniformly distributed pseudo-random numbers and generating a series of non-uniformly distributed psuedo-random numbers.

12. The apparatus of claim 11 wherein the distribution of the series of non-uniformly distributed pseudo-random numbers is selected from the group consisting of: a normal distribution, an exponential distribution, a Poisson distribution, a gamma distribution, and a hypergeometric distribution.

13. A system for implementing games for a plurality of players, the games having a deterministic component, a rule based non-deterministic component, and a random component, the system comprising:

a plurality of player interface units, each generating at least at least one player record of information indicating player-initiated events;

10 a gaming engine for implementing game rules in response to the at least one player record of information and generating random numbers required by the game rules;

a player network interface circuit coupled to communicate with each player interface unit;

15 a server network interface circuit coupled to communicate with the gaming engine;

a network bus coupled to the player network interface circuit and the server network interface circuit.

14. The system of claim 13, the gaming engine further comprising:

means responsive to the at least one player record for generating requests for sets of pseudo-random numbers;

a request queue storing a number of the requests for sets of pseudo-random numbers.

15. The system of claim 13 further comprising multitasking means within the gaming engine for independently and simultaneously processing each of the player records, generating output records for each of the player records, and directing the output records to the player interface units.

16. The apparatus of claim 13 further comprising:

first encryption means coupled to the server network interface circuit for encrypting information passed from the gaming engine to the network bus; and

second encryption means coupled to each of the player network interface circuits for encrypting information passed from the player interface unit to the network bus.

17. A uniform random number generator comprising:

at least one random number circuit providing a series of pseudo-random numbers on an output;

5 verification means coupled to receive the series of pseudo-random numbers from the random number circuit for verifying that the received pseudo-random numbers are statistically random, the verification

means having an output for supplying a series of
10 verified pseudo-random numbers;

control means coupled to the verification means
and the random number circuit for activating the
random number circuit and the verification means.

18. The uniform random number generator of
claim 17 further comprising buffer means coupled to
the verification means for storing numbers, the
buffer means having an input for receiving the
5 verified pseudo-random numbers from the verification
means and an output for distributing the verified
stored pseudo-random numbers.

19. The uniform random number generator of
claim 17 wherein the random number circuit comprises
an ANSI X9.17 circuit.

20. The uniform random number generator of
claim 17 further comprising:

at least two random number circuits, each of the
at least two random number circuits having
5 independent seed values and key values, the at least
two random number circuits providing at least two
independent series of pseudo-random numbers; and

the control means further comprises a coupling
to each of the at least two pseudo-random number
10 circuits for controllably coupling one of the at
least two series of pseudo-random numbers to the
verification means.

21. The uniform random number generator of
claim 18 wherein the buffer means comprises a first
in first out register.

22. The uniform random number generator of
claim 18 wherein the buffer means has a storage
capacity and output speed sufficient to provide
bursts of the stored verified pseudo-random numbers
5 at a rate greater than an output rate of the
verification means.

23. An apparatus for implementing a game having
a deterministic component and a non-deterministic
component, said apparatus comprising:

at least one player interface unit, each player
5 interface unit generating at least player record
indicating player-initiated events;

a random number generator providing a series of
pseudo-random numbers;

10 a rules library storing indexed rules for one or
more games;

an interface registry for storing mapping data,
the mapping data for mapping player record to pre-
selected rules in the rules library;

15 combinatorial algorithm storage means having a
bi-directional input/output port for storing
combinatorial algorithms in an executable form; and

control means coupled to the player interface to
receive the output of the player interface unit,
coupled to the interface registry, the rules library,
20 the combinatorial algorithm storage means, and the
random number generator, the control means for
processing the player record and returning an output
record to the player interface unit.

24. The apparatus of claim 23 wherein the random number generator further comprises:

a random number circuit including an encryption circuit;

5 verification means coupled to receive the output signal from the random number circuit for verifying that the received pseudo-random numbers are statistically random, the verification means having an output for supplying a series of verified pseudo-random numbers;

10 buffer means coupled to receive the verified pseudo-random numbers for temporarily storing the verified pseudo-random numbers, the buffer means having an output for distributing the stored verified pseudo-random numbers; and

15 random number generator control means coupled to the buffer means, verification means, and the pseudo-random number circuit for activating the random number circuit and the verification means and causing the buffer means to deliver a set of the stored verified random numbers on the buffer means output continuously.

25 The apparatus of claim 23 wherein the random number circuit includes a clock input for receiving an externally generated continuously variable signal, the apparatus further comprising:

5 means for generating a first clock signal on a clock output;

means generating a second clock signal from the time at which the player record is generated; and

10 means having an output coupled to the clock input for receiving and combining the first and

second clock signals to generate the continuously variable signal.

26. A method for generating random numbers comprising the steps of:

providing a signal comprising a continuously changing deterministic output;

5 encrypting the signal;

grouping the encrypted signal into sets of raw pseudo-random numbers; and

verifying that the raw pseudo-random numbers comprise independent, uniform, sets of statistically 10 pseudo-random numbers.

27. The method of claim 26 further comprising:

temporarily storing the verified pseudo-random numbers in a buffer; and

5 distributing a portion of the stored, verified pseudo-random numbers from the buffer in response to a request from a device external to the random number generator.

28. An method for implementing a game, the game having a deterministic component, a rule based non-deterministic component, and a random component, the method comprising the steps of:

5 generating at least a first player record of information indicating a player-initiated event from a first player;

generating a signal comprising a series of uniformly distributed pseudo-random numbers;

- 10 verifying that the series of uniformly distributed pseudo-random numbers are statistically random;
- 11 temporarily storing the verified pseudo-random numbers;
- 12 distributing a portion of the stored verified random numbers in response to a request;
- 13 providing a rules library storing indexed rules for one or more games;
- 14 providing an interface registry for storing mapping data records, the mapping data records for mapping the first player record to pre-selected rules in the rules library; and
- 15 processing the player record, the processing comprising the steps of:
 - 16 (i) referring to the interface registry to map the first player record to a selected rule in the rules library,
 - 17 (ii) executing the selected rule by selectively referring to the combinatorial algorithm storage means and selectively generating requests for sets of verified pseudo-random numbers from the buffer means output, and
 - 18 (iii) generating an output record indicating results of the execution step, the output record directed to the first player interface unit.